US Army Corps of Engineers®

R&D Program: TOWNS

Work Unit: Flood Frequency Analysis Methods for Changing (Non-Stationary) Urban Environments

Needs & Problems Addressed:

- Assumption of a stationary data series not applicable in urban environments experiencing growth
- Need techniques for performing extreme event frequency analysis when non-stationarity exists
- Underestimation of the magnitude of events at a specified frequency of occurrence leads to inappropriately designed FDR measures

Pictures, diagrams, etc. depicting the needs & problems

Objectives:

- Develop USACE methodology and guidance on performing flood frequency analysis for an urban location in which the historical record is non-stationary

Pictures, diagrams, etc., depicting objectives

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Work Unit Funding Profile:

FY03	FY04	FY05	Total
$ 50k	$ 50k	$ 0 k	$ 100k

Comments on funding plan:

- Provides needed niche in Corps frequency analyses at low cost

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Business Program/Missions Areas Supported:

- Inland Navigation __ %
- Coastal Navigation __ %
- Coastal Storm Damage Reduction 20 %
- Inland Flood Control/Damage Reduction 80 %
- Environmental Protection & Quality __ %
- Multi-Purpose (Hydropower, Rec & Water Supply) __ %
- Emergency Management __ %
- Regulatory __ %
- Support for Others __ %

(Must to add to 100%) Total: 100 %

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CW Strategic Goals Check List: (check if applies)

- Provide sustainable water resources development & mgmt _X_
- Restore past environment degradation ___
- Provide project services of high quality _X_
- Reduce losses from natural & manmade hazards _X_
- Supports being a world class technical leader _X_
- Addresses strategic or system needs in a framework or integrated approach by developing:
  - Methods or decision support tools _X_
  - Technology to improve life cycle productivity ___
  - Technology to monitor systems, provide feedback and develop operating guidance ___

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Which “short term” field needs does this support:

- Improves efficiencies in planning
- Improves decision making
- Reduces life-cycle costs
- Improves public safety

Field Review Group Relative Ranking:

- FRG planned 21-22 August 2002

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Listening Sessions Check List: (check if applies)

- Improves data sharing/exchange with the public in these areas:
  - Provides one stop shop for maps & data for basin wide planning ___
  - Provides data to make informed decisions _X_
  - Provides a system for basin wide planning ___
  - Provides information about what is happening at Corps facilities ___ (up to date web sites)
- Tech Transfer plan to include educating the public _X_
- Coordinate research, models, analysis with regulatory agencies to insure results will be accepted _X_
- Develop R&D products:
  - For watershed management plans, not just at the project level _X_
  - To include aesthetics as components of all projects ___
- Create better models for ground & surface water ___

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Products:

- EM with proposed methodology
- New or modified frequency analysis software
- Method included in PROSPECT training

Pictures, diagrams, etc. depicting the products & benefits

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Benefits

- Direct:
  - Guidance on how to appropriately plan FDR measures in areas with non-stationary conditions
  - Potential ROI high
- Indirect:
  - Better protection of urban areas
  - More efficient use of public investment in flood protection infrastructure

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Technology Transfer Plan:

- EM describing how USACE studies should address time-series stationarity in flood frequency analysis
- New or modified software to perform analysis
- Include methodology in PROSPECT training courses
- Knowledge gained will be made available to educate the public through the TOWNS website
- Research coordinated with regulatory agencies

Pictures, diagrams, etc. depicting the tech transfer

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Why should the Corps fund this R&D, instead of private industry and/or others:

- There is no incentive for private agencies to invest in this work

What is Impact if not started:

- Application of a stationary flood frequency method to non-stationary data could under estimate or over estimate risk levels, thus decreasing public safety or increasing life cycle costs